Practicals and adhering to the Gatsby report

- Set your paper up as a mind map. Answer the following questions
- Starter: Imagine you are planning one of the physics or chemistry practicals you have completed thus far.

How do you support students to achieve/complete the practical successfully?

What does successful completion mean? Is it developing a new skill securing subject knowledge or both?

How do you know pupils have made progress?

How do you assess the progress students are making?

What questions are you going to be asking?

What are your reflections on the answers you have given above? Is anything surprising?

Practicals and adhering to the Gatsby report

TS link ts3 Demonstrate good subject and curriculum knowledge

have a secure knowledge of the relevant subject(s) and curriculum areas, foster and maintain pupils' interest in the subject, and address misunderstandings

demonstrate a critical understanding of developments in the subject and curriculum areas, and promote the value of scholarship.

TS4

Reflect systematically on the effectiveness of lessons and approaches to teaching

Contribute to the design and provision of an engaging curriculum within the relevant subject area(s).

Remember the good practical science report?

How can you make these recommendations part of your everyday practice?

PURPOSEFUL PRACTICAL SCIENCE	Teachers should know the purpose of any practical science activity, and it should be planned and executed so it is effective and integrated with other science learning.
4 FREQUENT AND VARIED PRACTICAL SCIENCE	Students should experience a practical activity in at least half of their science lessons. These activities can be short or long, but should be varied in type.
7 REAL EXPERIMENTS, VIRTUAL ENHANCEMENTS	Teachers should use digital technologies to support and enhance practical experience, but not to replace it.
ASSESSMENT FIT FOR PURPOSE	Assessment of students' work in science should include assessment of their practical knowledge, skills and behaviours. This applies to both formative and summative assessment.

Holman (2017)

Assessment fit for purpose – an example of the osmosis required practical

ASSESSMENT FIT FOR PURPOSE	Assessment of students' work in science should include assessment of their practical knowledge, skills and behaviours. This applies to both formative and summative assessment.

- Look back at your answer to how you know students made progress. Based on the statement above is there anything you missed off
- Take the example of Osmosis: what are you assessing in this required practical?

Write your answers to each of these questions on your mind map

- Look at the AQA biology practical book available on the science moodle page

Imagine you are completing the lesson plan

Date	Time	Class/Set	Lesson No	No. in class	Room

Your targets from weekly training meeting relevant to this lesson

Background of the class context of your teaching and learning plan and your expectations

Targeted Support:	Additional Adults:

Relevant Curriculum Statements

Pre-supposed knowledge / Possible Concepts / Misconceptions / Alternative Ideas

How do you identify the most relevant previous knowledge? What are the possible misconceptions? How do you know whether your students hold those misconceptions?

Learning points:

- What are your main learning points for the lesson? – where do you get all this information?

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AQA
Realising potential

AQA
Realising potential

How do you know what to assess- AQA practical guide

Osmosis

Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.

	Trilogy	Synergy	Biology
RPA	2	4	3
Specification reference	4.1.3.2	4.1.3.3	4.1.3.2

By using this method your students will have the opportunity to develop the following aspects of the biology AT skills	
AT 1	use of appropriate apparatus to measure and record a range of measurements accurately including length, mass and volume of liquid
AT 3	use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes
AT 5	measurement of rate of reaction by a variety of methods including an uptake of water

- Add to your mind map.
- How do you know what to assess in the lesson?
- How do you know students are making progress?

- Review the AQA required practical for Osmosis available on page 37 of the required practical booklet. To what extent does this practical allow:

- A varied approach including student led enquiry
- Appropriate assessment? To what extent

How do you know what to assess The example past paper question

- Complete the past paper question on osmosis available on Moodle In teaching resources under a folder called practical science and the Gatsby report. What are your reflections? How will you adapt the required practical to support your students access to this question?

How do you identify the most important prerequisite knowledge? A reminder on BEST

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This page is a working draft that will be updated during the research and writing process. ***Last updated: September 2021***

Find (1/1)
osmosis
Previous Next

Topic BCL5
Exchange and transport

Key concepts:

BCL5.1 Diffusion, osmosis and active transport

BCL5.2 Supplying cells – exchange surfaces and transport systems in humans

BCL5.3 Supplying cells – exchange surfaces and transport systems in plants

Topic BCL6
Coordination and control

Key concepts:

BCL6.1 The human nervous system

BCL6.2 The human endocrine system

BCL6.3 Homeostasis

BEST have produced a searchable curriculum map. Anything earlier in a column is preceding knowledge. You can use this to find the most appropriate proceeding knowledge, on this accoasion diffusion

Topic BVE4
Classification and subcellular evidence

Key concepts:

BVE4.1 Kingdoms, domains and subcellular evidence

Topic BHD4
Human lifestyles and health

Key concepts:

BHD4.1 Promoting good health: interacting factors and risk

A reminder on BEST

From the BEST curriculum map, you get a specific unique code. You can use this to search the BEST website for specific activities and diagnostic questions that test students' previous knowledge and misconceptions

BIG IDEA BCL:

THE CELLULAR BASIS OF LIFE

Organisms are made of one or more cells, which need a supply of energy and molecules to carry out life processes.

Topic BCL1
Cells

Key concepts:

- BCL1.1 Living, dead and never been alive
- BCL1.2 Cells and cell structures
- BCL1.3 Cell shape and size
- BCL1.4 Diffusion and the cell membrane

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STUDENT WORKSHEET

Deodorant

The teacher sprays deodorant at the front of the classroom.

At first, only the people at the front of the classroom can smell it.

After a while, people at the front **and** the back of the classroom can smell it.

Part 1

Look at the statements in the table. Some are right and some are wrong.

Tick **one** box for each statement.

	Statements	I am **sure** this is right	I **think** this is right	I **think** this is wrong	I am **sure** this is wrong
1	The deodorant moves across the classroom because of the wind.				
2	The deodorant reacts with the air, making it smell nice.				
	The deodorant splits into little bits and				

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TEACHER NOTES

Expected answers

Part 1

1. The deodorant moves across the classroom because of the wind – **wrong** (in a still room, the movement is due to diffusion of the deodorant molecules; no external force or mechanical event is required)
2. The deodorant reacts with the air, making it smell nice – **wrong** (diffusion does not involve a chemical reaction, only movement of molecules)
3. The deodorant splits into little bits and mixes with the air – **wrong** (the deodorant is a gas which is already made up of molecules; it is not a continuous substance that has to split)
4. The deodorant molecules move through the air by diffusion – **right**
5. The deodorant molecules need to spread out so they have more space – **wrong** (the molecules move randomly in all directions, and they do not need, want or choose to move in any particular direction; the spread from the front of the classroom to the back is a *net* movement, though molecules are moving in all directions)

Simulations enhance but do not replace practicals

- Read the two papers found in the practical science Gatsby report folder
- Question to reflect on. Do Phet simulations support students working scientifically skills?

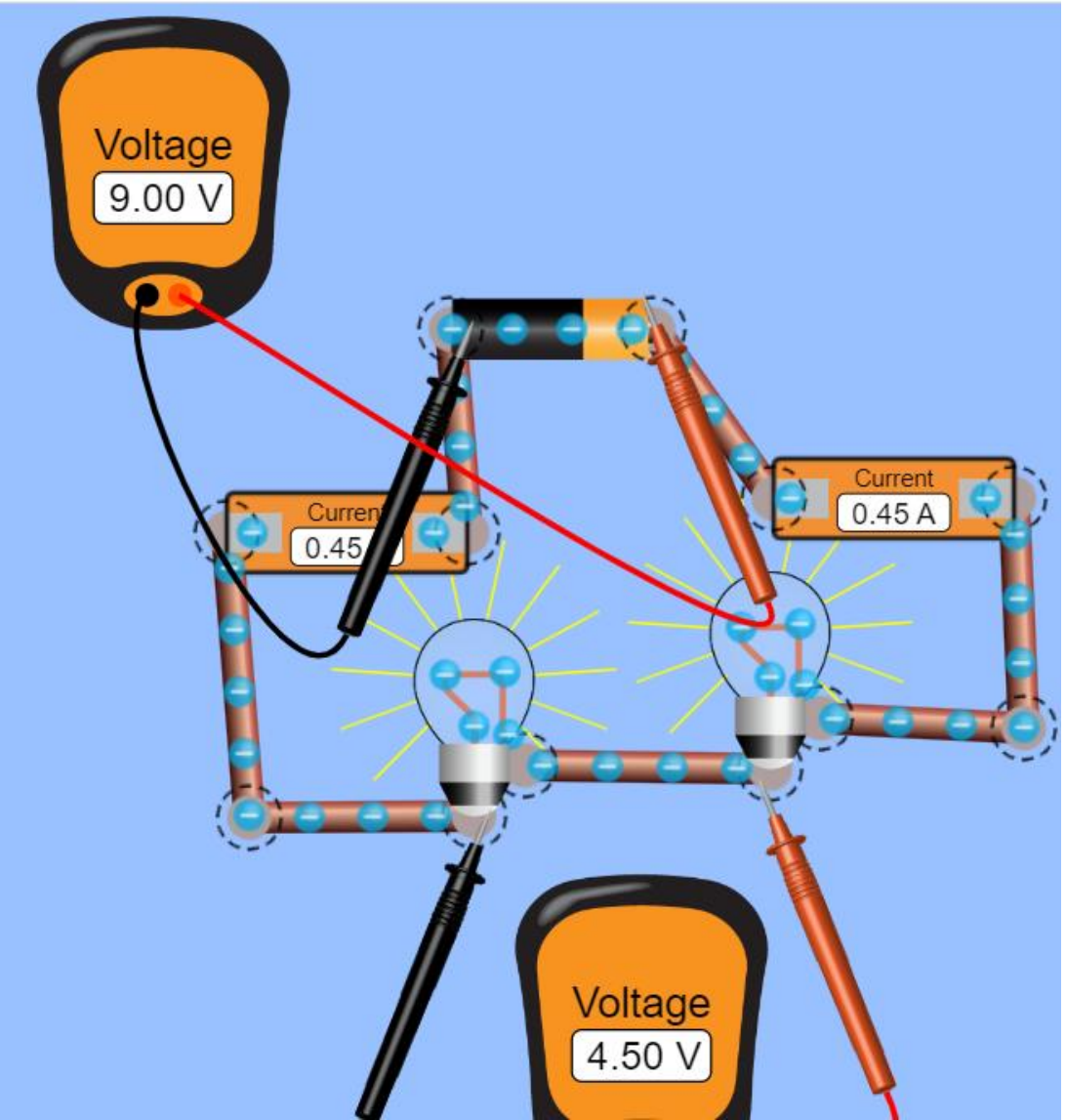
2. Experimental skills and strategies

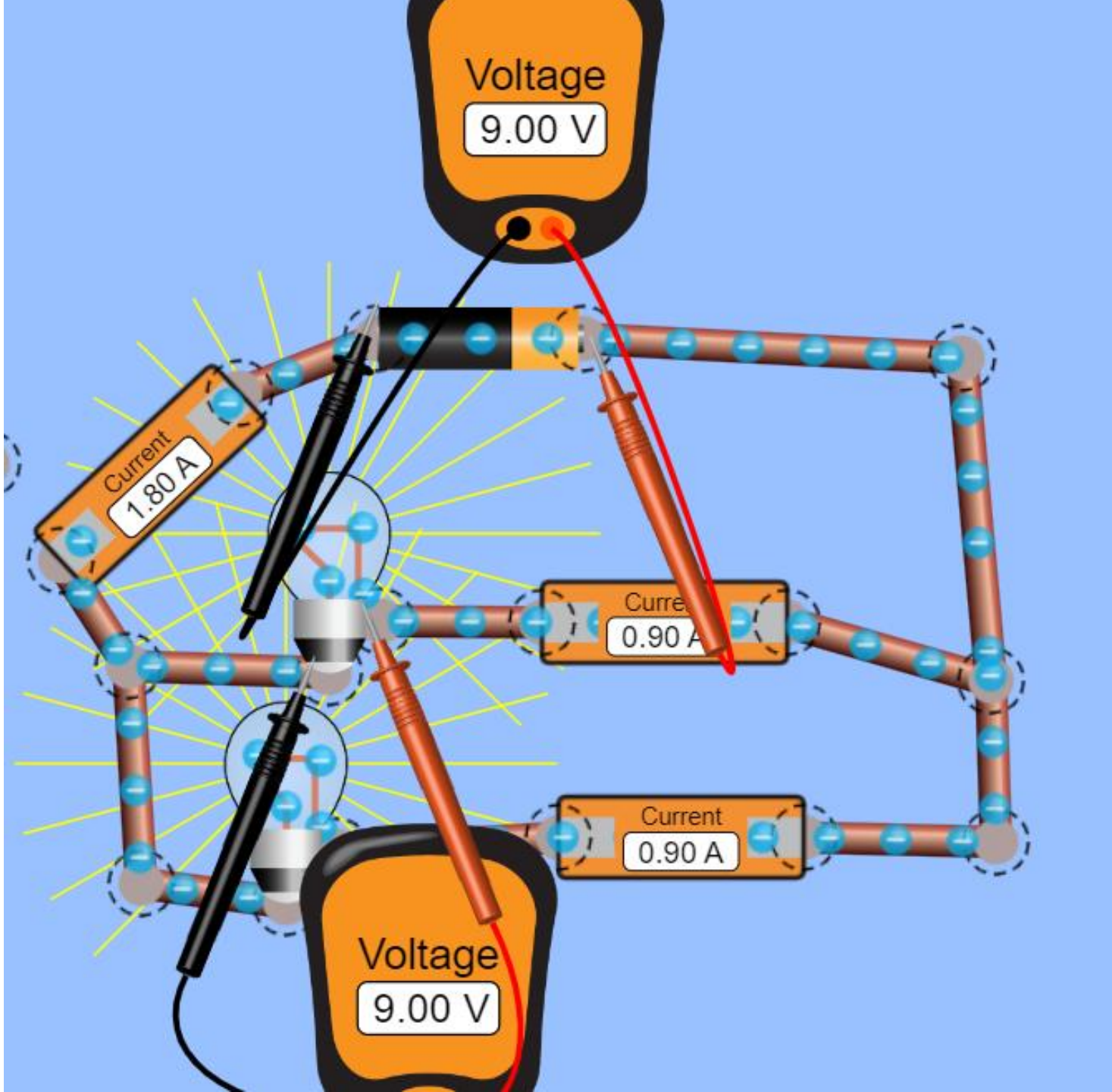
- using scientific theories and explanations t
- planning experiments to make observation phenomena
- applying a knowledge of a range of technic select those appropriate both for fieldwork
- carrying out experiments appropriately, hav manipulation of apparatus, the accuracy of safety considerations
- recognising when to apply a knowledge of samples collected are representative
- making and recording observations and me apparatus and methods
- evaluating methods and suggesting possib investigations.

3. Analysis and evaluation

- applying the cycle of collecting, presenting and analysing data, including:
  - presenting observations and other data using appropriate methods
  - translating data from one form to another
  - carrying out and representing mathematical and statistical analysis
  - representing distributions of results and making estimations of uncertainty
  - interpreting observations and other data, including identifying patterns and trends, making inferences and drawing conclusions
  - presenting reasoned explanations, including relating data to hypotheses
  - being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error
- communicating the scientific rationale for investigations, including the methods used, the findings and reasoned conclusions, using paper-based and electronic reports and presentations.

What are the advantages and potential limitations of simulations? Use the screenshots to give you ideas.





What might an example blended lesson look like

ROYAL SOCIETY OF CHEMISTRY

St Mary's University Twickenham London

Task

- Pick one of the required practicals at KS4.
- Use BEST to identify the most important prerequisite knowledge and misconceptions students may have
- Use BEST to design a starter Activity
- Explain how you hit each of the objectives from the Gatsby report in your lesson.
- Plenary reflect on your transition document. Following on from this session, what do you need to add to your targets for TS3/TS4?

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- Hasyim, F., Prastowo, T. and Jatmiko, B., 2020. The Use of Android-Based PhET Simulation as an Effort to Improve Students' Critical Thinking Skills during the Covid-19 Pandemic. Available at https://www.learntechlib.org/p/218400/ Accessed 30th May 2023.

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